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ABSTRACT

The aim of this paper is to not only outline certain problem areas but to also clarify the concept of personality as an educational phenomenon in order to serve the science of education, its teaching and its applications. For this purpose the article introduces certain formal considerations serving as a background for such a research project. Attention is directed to the problematic nature of the knowledge on which the conception of personality is based in ordinary experience. Unless scientific knowledge succeeds in extending to these crucial areas of personality, educational practice will be largely uninformed in these respects. Further, various methods to be used in the scientific description of personality are presented. And finally, certain paradigmatic foundations for the study of personality in the educational sciences are provisionally analyzed. The purpose of this article is to systematize central problems in the study of personality from the formal point of view. The special need of educational sciences is to develop its theoretical basis, its metascientific foundations. This form should then be filled with the content provided by further research. The paper concludes that the history of science proves it is possible to obtain valuable innovative hints from outside of science. (Author/LLL)

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Erkki A. Niskanen

PERSONALITY AS AN EDUCATIONAL PHENOMENON

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ABSTRACT

Although the concept of personality is widely used in the determination of educational aims, it lacks the precision and systematic force required of scientific concepts. This means that, to a large extent, educational practice has to function in a theoretical vacuum while aiming at many-sided personality development. An extensive scientific research programme as the co-operative effort of various scientific disciplines is required to remedy this anomaly. The aim of this paper is to outline certain problem areas crucial for such a research project.

For this purpose the article introduces certain formal considerations serving as a background for such a research project. Attention is directed to the problematic nature of the knowledge on which our conception of personality is based in ordinary experience. Unless scientific knowledge succeeds in extending to these crucial areas of personality, our educational practice will be largely uninformed in these respects. Further, various methods to be used in the scientific description of personality are presented. And finally, certain paradigmatic foundations for the study of personality in the educational sciences are provisionally analyzed.

The purpose of this article is to systematize central problems in the study of personality from the formal point of view: The special need of educational science is to develop its theoretical basis, its metascientific foundations. This form should then be filled with the content provided by further research.

Keywords: personality, paradigmatic foundations, educational research methods

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PREFACE

The aim of this paper is to problematize and clarify personality as an educational phenomenon in order to serve the science of education, its teaching and applications. One reason for this consideration is that the following is stated in the resolutions of the United Nations, Unesco and the laws of most countries: One of the aims of education is the many-sided development of personality. However, personality has not been clearly defined. From the point of view of education it is problematic that the scientific description of personality is narrower than personality as an educational phenomenon. Thus education has to proceed in uncertain conditions while aiming at personality development. One of the aims of this paper is to widen the scientific description of personality.

I shall discuss certain issues in the theory of science but only to the extent that is necessary from the point of view of personality research. While presenting various scientific approaches and schools of thought, my aim is to present fundamental problems for future research, not to take sides. In one sense this paper forms the foundation for an extensive research programme. I have formed a research project on the study of personality.

One of my central aims in this paper is to present various scientific methods for use in personality description. I limit my discussion to the form and theoretical foundations of these methods. In future research it would be useful to fill out this framework with content.

In problematizing the phenomenon of personality I have encountered several problems. I have systematized these problems as the paradigmatic foundations of the educational personality phenomenon. I do not intend to present one determinate personality description for education, but rather to bring out various possibilities for the definition of personality in the educational sciences. My aim is to stimulate discussion, arguments and critical analysis for the development of educational personality research.

I have studied and taught education and psychology at the University for 40 years. I have used various sources by several scholars on personality to the extent that it is difficult to specify my sources. Much of my knowledge has been acquired in personal discussions. This makes it difficult to anchor my knowledge to certain books and discussions. In the past few years I have had scientific discussions with various colleagues in Finland and abroad. These discussions have widened my views and given me both theoretical and practical knowledge about personality. The following Finnish professors have inspired my thinking on personality: Martti Takala, Niilo Mäki, Veikko Heinonen, Väinö Heikkinen, R. Olavi Viitamäki, Anna-Liisa Leino, Timo Airaksinen. Docent Vesa A. Niskanen has helped me with issues concerning the metascience. Dr. Tapio Puolimatka helped to modify the text. The discussions with the following foreign professors enriched my thinking: Heino Liimets, the Soviet Academy, Tarto, Doctor Honoris Causa, Helsinki; Helmut Klein, Humboldt University in Berlin, Doctor Honoris Causa, Helsinki; David Hunt, The Ontario Institute for Studies in Education, University of Toronto, Doctor Honoris Causa, Helsinki; Charles Letteri, University of Vermont, Doctor Honoris Causa, Helsinki; Vello Sermat,

University of York; John Niemi, Northern Illinois University, Doctor Honoris Causa, Helsinki; Theo Glocke, University of Erfurt; Harold O. Soderquist, Wayne State University.

I have only been able to take into account research on personality in Finnish, Swedish, English and German. I have not been able to acquire Russian studies on the subject in their original form. I have tried to narrow this gap through long discussions with the President of the Soviet Academy of Pedagogic Sciences, A. K. Babanski and Vice-President Nina Talyzina, in which they have widened my knowledge of Russian personality research. I have become acquainted with Chinese, Japanese and Korean research on personality through the Academy of Science of the Democratic People's Republic of Korea. The members of the Academy have the required language skills to acquaint themselves with personality research in these languages. I have been able to work together with them in Finland and in Korea, especially with the Vice-President of the Academy Li Dong Gun.

While acting as the President of the World Congress of Educational Science which was arranged in Helsinki I had an opportunity for discussions with various participants in the conference. The theme of the conference was *Personality, Education and Society*. Concerning the applications of the education of personality I have received information from various members of Finnish planning committees. I have also acted as the chairman of various such committees appointed by the State of Finland.

Without forgetting anyone, or especially mentioning anyone, I thank the large group of researchers, whose research and ideas I have been able to use as the foundation of my article.

Helsinki, October 1990
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INTRODUCTION

The aim of this article is to discuss personality as a central concept in the educational sciences as well as in many of its complementary disciplines. For my purposes it is sufficient to define the educational sciences as an extensive scientific whole; to give an elaborate definition would almost require an article in itself.

In all branches of science there are a few essential phenomena around which a great amount of scientific activity pivots. In the behavioural sciences one such phenomenon is that of personality. The development of the educational sciences - as well as that of educational planning and implementation - requires constant scientific discussion of the concept of personality.

Personality as a concept is assumed to be clear, and it is often used in the educational sciences without defining it explicitly. The concept is also widely used in decision-making. Thus one would presume the term to be precisely defined and generally understood.

Of special importance for us here is the formulation of educational aims. Educational aims define the change which education is meant to bring about in an individual, in society and through these two in nature. Educational aims are based on facts and values which are often very general and they are specified in institutional decisions. The term personality is used, for example, in the resolutions of the United Nations and of various governments. One central

educational aim is the many-sided development of individual personality. One would expect the concept of personality, as used in these institutional decisions, to be exactly specified, clear and uniform. However, in the following I shall point out problem areas where the concept is not so clear and where it should be further clarified.

During the past few decades the concept of personality has been defined in various new ways in the educational sciences. An attempt has been made to describe personality through its organized constituents. In the description of intelligence there has been a shift from general intelligence to its specific factors. An attempt has been made to analyse the affective sphere of personality through its subdivisions. In the Cattelian description, personality has been described as relatively specific traits. Eysenck has endeavoured to describe such larger personality trait-complexes as extroversion and introversion. There has been an attempt to isolate the elementary factors of motor behaviour. Instinctual behaviour has also been described on the foundations of elementary factors. The concept of personality has been elucidated by describing its extensive subdivisions, by isolating from these subdivisions elementary factors, and by describing their interrelationships. The behavioural scientist uses multi-dimensional space as the framework for his idea of man's personality. In that space personality is fragmentized. It contains a great amount of organized knowledge, but that knowledge has to be integrated. In addition, important factors that are educationally relevant have been left out of the description. In the following I shall concentrate on personality as an integrated totality. In such a concise article I am not able fully to discuss the whole area relevant for the study of personality.

A further question is whether we should restrict our discussion to scientific knowledge alone. In certain scientific approaches no other type of knowledge is accepted. If we accepted only scientific knowledge, we would be restricted to a narrow sphere of personality. This would be educationally problematic. The sphere of personality that can presently be described scientifically is too narrow for educational purposes. The domain of personality that has so far been scientifically studied is much more limited than the domain of education as defined by educational aims. Consequently, there seems to be no alternative to educating, to a large extent, in a scientific vacuum. Personality research should be intensively continued in order to produce new scientific knowledge and to widen the domain of the scientific description of personality.

In education one is often obliged to rely on ordinary knowledge. For example, scientific knowledge about learning, thinking and emotional life contains such gaps that we often have to rely on ordinary knowledge. In this situation an educational researcher has to resort to knowledge obtained through practical experience as well as through experiments while endeavouring to outline theories or models in order to further specify the knowledge available.

The behavioural sciences use the concept of personality to describe man's behaviour and some of man's subdivisions. It is often not clear what the difference is between the concepts man and personality. Could one not replace the latter concept by the former? Similar questions can be asked with regard to another concept that is frequently used in the behavioural sciences, the concept of the individual. When reading behavioural scientific literature one gets the impression that personality is a subdivision of man. Such human characteristics

which are not the actual objects of study of the behavioural sciences have been left outside of the concept of personality. Those who have defined the concept of personality have not been willing to specify how the concept of man and the concept of personality are to be differentiated. According to one view the phenomenon of personality is more extensive than the concept of either man or the individual. Often man is defined as extending to four dimensions, i.e., man as such, man in his relation to other persons, to society and to the universe in general. Man is seen to have such close ties to these entities that he is, in fact, a larger concentrated whole. This viewpoint might lead one to think that the concept of personality is more extensive than the concept of man. The concept of personality would then include man's relation to the foregoing entities, provided that they have become permanent behavioural patterns. These patterns might be included in the definition of personality in its widest sense.

In this article I shall deal with the theoretical foundations of the study of personality in the educational sciences and their complementary disciplines. My discussion intends to serve the educational sciences, their applications and teaching. In a later part I shall analyze current knowledge about personality in an endeavour to create generalizing conceptions. I hope that these notions stimulate discussion and help to focus research on the field.

Personality spheres have not been studied in the history of science equally. Research has progressed in certain spheres and resulted in exact definitions and theories, whereas other spheres have been neglected by behavioural scientists.

Personality is studied for various purposes. The central purpose is that of pure research, which aims at elucidating the concept of personality and structuring knowledge concerning it into systematic wholes. Laws, theories, or models have been constructed, and an attempt has been made to verify them. The second purpose is to provide material for teaching the educational sciences. This knowledge makes teaching more efficient and enables us to analyse it. The third purpose is to acquire knowledge that can be applied in various practical contexts. Many branches of science have to co-operate in providing knowledge on personality for purposes of application.

Philosophical views have an essential influence on the definition of personality. Philosophical schools of thought vary in what they include in the concept and in what they leave out of it. Sometimes the differences are clearly presented, sometimes they are almost indistinguishable. These differences are partly due to different levels of knowledge, as philosophical views vary in what they accept as relevant knowledge and in how they define the foundations of that knowledge. These epistemological differences lead to different ways of defining the field of personality. Here it is not possible to discuss thoroughly either the different approaches to the study of personality practised by various branches of science, or the differences resulting from scientific progress, different research purposes or philosophical views.

The importance of education and training has increased during the past decades. However, knowledge concerning education has not increased in the same proportion. Additionally, the increase in knowledge has concentrated on certain areas which have been considered important in society. Knowledge of

personality has been the privilege of certain restricted circles. The spreading of general and applied knowledge of personality is, however, important for public education. Researchers in the educational sciences have far-reaching roles in providing such knowledge.

The problem has been that knowledge about certain spheres of personality has been valued more than others. An example of such a highly valued sphere is that of intelligence. As a result, people have been unequally valued, which has negative social consequences. Guidance for choosing a line of education, other people's valuation of a person and man's self-valuation have been based only on certain specially valued personality spheres. The objectives of equality, fairness, happiness and goodness can be better achieved by regarding the various personality spheres equally.

The fact that certain personality spheres have been valued more highly than others has distorted our conception of man as well as man's adaptation to the community. Once personality spheres are equally valued, many central educational problems receive new dimensions. For example, the differentiation of training cannot be appropriately studied if the focus is merely on talent, as in some recent research. It becomes possible to define the relevant problems more adequately and to focus and direct research more properly once the issue is considered from the viewpoint of personality as an integrated totality, and not exclusively from that of talent. Guidance in choosing a line of education/training should be carried out from the standpoint of personality as a whole and not exclusively from the standpoint of one personality sphere.

The fact that one personality sphere has been valued more highly or been more emphasized may also have been a reflection on the general situation in society. Because of the increase in democracy and the hegemony of the democratic ideology, the sphere of attitudes has been considered important. This has promoted research on how to develop attitudes and reach attitudinal maturity. Certain personality spheres have been emphasized more than others, as a result of the high value placed on certain activities. Personality spheres supporting such a highly valued activity have come to be appreciated. The unequal valuation of personality spheres and its reasons are an important problem, but I cannot discuss it more thoroughly in this article. (On some further aspects of this question see Tapio Puolimatka: "Education in Values", Research Bulletin 74, Department of Education, University of Helsinki).

1. THEORETICAL FOUNDATIONS

In the definition of personality we deal with a complex scientific problem. A great amount of space would be required to discuss it thoroughly. I shall restrict my discussion to only a few problems. The scientific foundations of the educational sciences are not as developed as those of some other branches of science. While presenting my own views about the issue I cannot avoid discussing certain subjective conceptions, which are not strictly justified nor widely used in the educational sciences. I am aware that they are open to criticism. My main aim, however, is not to present a finalized theory but to stimulate scientific discussion.

Definitions constitute one central field in the theory of science. Since this subject has been discussed in another article in this project, the reader is referred to it (see Vesa A. Niskanen: "Describing Personality Utilizing the Theory of Fuzzy Systems", Research Bulletin 76, Department of Education, University of Helsinki).

The behavioural sciences have often adhered to the view that scientific concepts can be divided into the theoretical and the observational. Pure theory consists of theoretical concepts only. Theoretical concepts receive empirical interpretations through correspondence rules that connect them with observational concepts. Correspondence rules give partial definitions to theoretical terms.

The problem concerning the connection between theoretical and observational concepts can be approached by means of various research-operational measures. First of all, we can conceive theoretical and observational concepts as separate concept groups and use correspondence rules to connect them. In the second research-operational approach, observational concepts form a separate concept class and they function in a world of their own, so that the problem of the two worlds of the former approach can be minimized. In the third approach, concepts are divided into two classes, the theoretical and the observational. The empirical study of these concepts forms the actual research objective.

This standard view of scientific theories has encountered serious criticism. The supposedly unproblematic nature of observational concepts has been challenged. Preconceptions and presuppositions have been shown to influence observations - observation implies interpretation. Scientific observations, carried out with

refined technical instruments, are always made in a theoretical context. This means that there is no observational language that is free from conceptual and theoretical presuppositions - all observation is theory-laden and presupposes conceptual interpretation.

In general, the conduct of scientific inquiry should be objective, critical, autonomous and progressive. There are several relevant approaches to the phenomenon of personality, so that various methods may be used in its scientific description. In addition, the complex nature of this subject-matter requires sophisticated methods. To be effective the methods have to be problem-oriented - they have to focus on specific problem areas. Scientific schools of thought also influence the methods used in personality research. For example, for Gestalt pscyhologists a fundamental problem concerns the relations between an entity and its parts. Phenomenologists deal particularly with the problem of whether knowledge concerning behaviour can be analysed and the relation between analysed knowledge and knowledge as a whole.

1.1. The problem of knowledge

In this section some essential problems concerning the knowledge of personality will be considered. On the grounds of this consideration, a paradigmatic basis of the knowledge of personality will then be presented.

The concept of paradigm has been suggested, for example, by T.S. Kuhn and N.L. Gage. Kuhn regards paradigms as the foundations of scientific activity.

They include research traditions, methodological principles, ideas of the scientific community, evaluations, etc. Gage's paradigms are patterns of thought and foundations of science. These can be used as the foundations of theories. By 'paradigm' I mean the ultimate foundations of research. Thus paradigm can be defined as an instrument of science and a method for understanding reality. A paradigm has various tasks in different situations. The nature of a paradigm varies, which means that it has to be specified for various contexts. Thus I use the concept of paradigm to refer to the ultimate foundations and presuppositions of scientific research, for example, conceptions about knowledge, scientific approaches, methods and the phenomena under scrutiny. The paradigm of educational science includes constituents of metascience, in general, metascience of educational science, in particular, and specific constituents of research work. As paradigms, in this sense, are complex, varied and unstationary by nature, it seems intelligible to define separate paradigmatic foundations. In the study of personality such paradigmatic foundations include, for example, the definition of basic concepts, foundations of functional mechanisms, and levels of personality.

Scientific knowledge can have various ideal forms. Knowledge should be exact, objective, intersubjective, testable, reliable, and clear. In case we restricted the sphere of knowledge to scientific knowledge only, the description of personality would be restricted to a narrow sphere of the whole phenomenon. So, together with scientific knowledge we also have to use other kinds of knowledge the truth value of which is more problematic, but specifying the type of knowledge used in the context is always important. I apply the term 'knowledge' to all forms of knowledge, even though ideally the term should be restricted to

scientific knowledge. I use an adjective before the term 'knowledge' to point out the particular kind of knowledge in question.

I consider it possible to distinguish between three types of knowledge: scientific knowledge, ordinary knowledge and conviction-based knowledge. Scientific knowledge is relatively reliable, while the truth value of ordinary knowledge is far more problematic - it is knowledge that has not been explained, articulated or specified. Conviction-based knowledge is not usually regarded as knowledge at all - it consists of religious and ideological convictions which are regarded as knowledge by their holders. In education, however, we have to take this presumption of knowledge into account, since it competes with other forms of knowledge in the guidance of education. Religious or ideological conviction-based knowledge can assume the leading role in forming educational aims.

The phenomenon of personality should ideally be defined on the basis of scientific knowledge alone. But the behavioural and educational sciences have also tended to use ordinary knowledge (which is often intuitive) in the description of personality, in addition to which they sometimes introduce conviction-based knowledge as well. The scientific community should aim at reaching an agreement on the paradigmatic foundations of knowledge. If the field of knowledge is extended, the field of personality is also widened, but such a loose sense of knowledge might allow unreliable information constituents to pass as knowledge. As regards the educational phenomena, we often have to be satisfied with probable knowledge, the certainty of which is expressed with a determined probability. I present the foregoing comments on knowledge as an

attempt to define a crucial problem area in the study of personality without trying to find a solution to it in this paper.

One interesting ontological framework that could be used for clarifying the problem concerning knowledge in the study of personality is Sir Karl Popper's suggestion of a three-world ontology. It is a pluralist view of the universe that recognizes at least three different but interacting sub-universes. There is, first, the physical world which consists of physical bodies and processes, 'World 1'. Second, there is the world of mental or psychological states or processes, or of subjective experiences, 'World 2'. And third, there is the world of the products of the human mind, 'World 3'. World 3 includes abstract entities produced by the human mind (propositions, theories, numbers, values, ideologies etc.), material artefacts ("culture") and social institutions (educational programmes, sport clubs etc.). The very idea of a self or a person mainly depends on world 3 theories.

The most crucial thesis in Popper's three-world ontology is his defence of the reality of world 3 objects: They can be real in that they can have a causal effect upon our world 2 experiences and our world 1 brains, and thus upon material bodies. Popper distinguishes between knowledge in the subjective and objective senses. Knowledge in the subjective sense consists of our subjective world of expectations. Knowledge in the objective sense consists of thought contents, not of thought processes. Thought processes belong to world 2 whereas thought contents belong to world 3.

The phenomena studied in the educational sciences are often extensive. We often encounter situations requiring knowledge about different levels of a complex phenomenon or process. The classification of research problems and the analysis of the results become more reliable if the phenomenon is divided into sections according to the kind of knowledge that we have about it. It is not sufficient to classify the problems contentually. One important classificatory basis is the nature of the knowledge concerned. Usually we have a situation where part of the phenomenon or process remains unknown. For example, the stimulus and the reaction are known, but the process in an individual remains unknown. The unknown area and areas about which we have unreliable knowledge can also be dealt with. The discussion consists of presumptions, the certainty of which depends on many of the factors influencing it.

Objects of knowledge, such as facts and phenomena, may be exact or inexact. If mathematical apparatus has been applied in this context, conventional set theory has usually been employed. According to this theory, an object either belongs or does not belong to a given set. In fuzzy set theory, on the other hand, an object can belong to a set only partially. If we assume that the value 1 implies full membership and the value 0 non-membership in a given set, then, according to fuzzy set theory, the values in the open interval from 0 to 1 denote partial memberships. The application of fuzzy sets, when describing personality, is performed in a separate article by Vesa A. Niskanen.

Sometimes we deal with knowledge which is in a very general and unorganized form, but which can be scientifically useful while outlining problems, evaluating

methods, formulating theories, laws, models, paradigms, or facts. Knowledge of this kind directs thinking.

In the case of erroneous knowledge the type of the error varies. In the following some methods for studying errors are presented.

1. An error is quantified
2. An error is estimated
3. The existence of an error is recognized
4. The existence of an error is recognized on the basis of logical deduction
5. An error is presumed to exist on the basis of partial knowledge.

On the grounds of the foregoing ideas, the following paradigmatic basis of the knowledge of personality may be provided. First, Popper's views also seem to have educational relevance. Personality as an educational phenomenon is very extensive. Our present store of knowledge concerning personality is rich, but not adequate for purposes of the scientific definition of personality. Second, there is an urgent need to extend the realm of objective knowledge in Popper's sense, since the description of personality requires knowledge of various forms and contents. As regards personality, in principle we could classify more universes than those included in Popper's three worlds, but this matter requires further examination. Third, the fundamental difficulty is that personality as an educational phenomenon is so extensive that educational personality description has to use knowledge that is difficult to define in the traditional framework of scientific knowledge. Fourth, the classification of the forms and contents of

knowledge about personality facilitates the utilization of this knowledge in research, teaching and applications. Fifth, knowledge is specific to different sciences. Educational science uses various kinds of knowledge.

1.2. The systematization of knowledge

One essential problem in science concerns the systematization of knowledge. Since personality is an extensive phenomenon, this problem has to be considered, especially since we have to deal with various kinds of knowledge in the field of personality. An additional problem is that the relevant knowledge is dynamic by nature. An attempt has been made to organize knowledge about personality into entitities, structures and systems.

In the systematization of knowledge about personality the educational paradigm can be applied and paradigmatic foundations can be formulated.

The concept of 'theory' has several meanings. 'Theory' sometimes means certain general conceptions acquired through rational processes ('the theory of physics', 'the theory of music'). It is also used to refer to a whole field of research ('decision theory', 'information theory'). It can mean a system of knowledge developed withing a scientific discipline ('the theory of relativity'). In the humanistic sciences 'theory' sometimes means a hypothesis about a particular phenomenon (for example, a theory on the historical Socrates). And further, 'theory' can refer to a total research programme (for example, the

theory of cultural evolution) which provides a basis for the formulation of various subtheories.

In the context of personality description 'theory' usually means that systematic and abstract organization of knowledge in the scientific community which goes beyond a mere generalization of the research data. In this sense a theory consists of a systematic, often axiomatized, collection of theoretical or empirical laws and presuppositions about the existence of the relevant theoretical entities. Theories tell us what kinds of things there are in the world and how these things regularly interrelate. Theory employs constructs (theoretical concepts) that have been developed to explain and systematize our empirical knowledge on a high level of generality and systematic exactness. A common procedure is to construct a theory which can concern personality as a whole or a part of it.

Theories of personality reflect various scientific schools of thought, for example, Marxist, psychoanalytic, religious etc.. Examples of theories describing personality or its sectors are those by Allport, Cattell, Eysenck, Bunge, Gilford, Spearman, Thurstone, Davidov, Skinner, Hull, Maslow... to mention but a few. Personality theories organize the relevant knowledge and present it as systems and structures. There is ultimately, however, such a great number of different theories that an individual scientist, student or person applying the information finds it difficult to appropriate and analyse it all. It would be practical to classify this theoretical knowledge on the bases of scientific approaches and contents.

Knowledge can also be systematized through laws, although in the sphere of behaviour we rarely succeed in defining phenomena in that form. However, in the behavioural sciences, too, scientists proceed by drawing up hypotheses and attempting to test them. The concept of law is problematic in the philosophy of science. If we accept the Humean view that laws only express the factual conjunction of events and properties (the so called constant conjuction view), we cannot distinguish between contingent generalizations and laws. To give to laws counterfactual force we would have to presuppose the conception of 'physical necessity' in addition to 'logical necessity', that is, we would have to suppose that we can justifiably speak about the 'physically possible' alternatives to our actual world.

An attempt has also been made to collect knowledge in the form of models. Models are those interpretations in which formal theories are realized. While theories essentially comprise linguistic entities (sets of sentences), models have non-linguistic set-theoretical structures consisting of concrete or abstract objects. Achinstein classifies models into three main classes: representational models, theoretical models, and imaginary models. Examples of representational models are provided by engineers' scale models and similar analogical models. Theoretical models are collections of simplified and idealised assumptions about objects or systems, especially their inner structure. Imaginary models are like theoretical models except that they are not supposed to be even approximately true or credible.

When systematizing knowledge about personality, one particular area is that based on multidimensional methods. These methods have been used for systematizing knowledge to form entities, structures and systems.

1.3. The methods used in personality description

A primary assumption in the definition of personality is that each human being is an individual personality. The scientific description of human beings, however, would be complex and laborious if we had to produce a different description for each personality. We can assume that a delimited group of human beings shares certain clearly identifiable forms of behaviour and, furthermore, that certain behavioral areas in personality are common to all human beings.

As a paradigmatic basic principle the following can be stated. There is reason to try to describe personality on such a level of generality that it would cover all human beings. For specific purposes it is also appropriate to describe personality traits common to delimited groups of human beings. The description of an individual personality can also serve its purpose as each individual is unique.

A review of the scientific literature shows that personality has been presented in various ways in the different branches of science specializing in particular personality spheres.

Personality can be described quantitatively or qualitatively, in which cases the methods used in description have traditionally been different. However, in personality description methods have been developed enabling the difference between qualitative and quantitative description to be practically ignored.

I shall present a type description, a description based on theory of fuzzy systems, a dimension description, as well as a description based on multidimensional configurations as approaches to personality description. The application of various alternative methods to personality description is fully justified.

General knowledge of personality can be provided by conceptualizing the behaviour comprising this area. The methods of concept formation can be specified by utilizing the general principles concerning the description of scientific phenomena. The use of verbal symbols for the description is the basis for definitions. The structuring of the forms of description promotes the exchange of information between scholars, those who apply the information, and students of education. In the process of creating a conceptual system for personality description the paradigmatic basic principles of the behavioural sciences will serve as a basis.

Personality as a phenomenon forms a complex whole, therefore the logical structuring of its component parts is useful. Drawing logical deductions on the basis of facts is one aspect of logical description.

The description of personality has also been implemented by means of fundamental behavioural laws. In some rare domains these laws are based on mathematical quantities.

Personality has also been described by means of theories. Sometimes these theories concern the broad field of personality, but mostly they only deal with parts of it.

Models have also been used in the description. Models mainly concern an area of personality and the relations between the areas.

Personality as a whole or one of its spheres has been described using a type. As a classical example of type description we have Kretschmer's and Sheldon's typologies. The description of personality as types has recently been directed at various separate personality spheres, of which learning types, knowledge-processing types and emotion types serve as examples. Organized and relatively exact knowledge about specific spheres of personality has been obtained on the basis of type description, although the knowledge often remains on a general level. A prerequisite for the success of type description is that the paradigms, laws, theories, models or other entities providing the bases for the description are scientifically justified, appropriate for the specific needs of personality description, and based on reliable knowledge.

Defining personality as types is a taxonomical problem. In the conventional type description as understood according to conventional set theory the object either belongs or does not belong to a given set. In certain borderline cases the

problem arises of whether the types (or classes) are to be understood as mutually exclusive or overlapping sets. The theory of fuzzy systems can be applied to solve this problem, because it was particularly developed to deal with vague entities. In the framework of fuzzy set theory the object can belong to a set partially. Fuzzy sets are actually subsets of a given space, so that when dealing with fuzzy sets we always have to consider several subsets. The application of fuzzy logic makes the use of types more versatile and combines separate classes of the dimension description in borderline cases.

An area of personality or a single personality trait can also be understood as a dimension by means of which personality is quantified in a space determined by the dimension. Positivistic behavioural scientists have made particular use of the concept of dimension, and they have attempted to obtain exact and detailed knowledge on its use in the description of personality. But this approach encounters many problems. It is problematic to establish and name a dimension. The name should convey both universality and the kind of specificity which would guarantee its correspondence to the phenomenon under scrutiny. It is also a problem whether the dimension can be named on the basis of only one concept, or as a linkage between two concepts, or by means of several complementary concepts between which there is such a linkage that it can be described as a dimension. One problem is that the dimension is often assumed to be rectilinear, even though the phenomenon could be curvilinear. The allocation of individual observations along the dimension on the basis of the measurements is also a problem. The use of scales may cause additional difficulties.

The relations between the dimensions describing different spheres of personality have also become a problem. The behavioural sciences have advanced from one-dimensional to multidimensional descriptions of personality. In the multidimensional approach, several dimensions concerning each sphere of personality are established on the basis of logical, theoretical or empirical knowledge. Individual dimensions are formed together into a configuration of dimensions. The configuration is mathematically established in such a manner that it is directed and assigne, which implies that the separate vectors are assigned in space to traverse a point and the dimensions are directed against one another at determined angles. Thus a multidimensional configuration is formed, in the framework of which the behaviour of an individual can be described in relation to the individual dimension as well as to the other dimensions. Since the number of the dimensions to be formed is, in principle, infinite, the multidimensional space helps us to describe personality phenomena in detail. Arithmetically, the spaces are dealt with as matrix calculations, so the multidimensional space achieves its concrete form as a matrix.

There are also fundamental problems in the multidimensional description of personality. The mathematical foundations of the knowledge at our disposal are restricted by problems that arise in the process of specifying the scale. An example of such a problem is that there is no zero point in the many scales used for the measurement of behaviour. Another problem is that the scale cannot be furnished with equally equipped intervals. Due to these problems, there are restrictions as to the necessary processes of calculation.

Another fundamental problem is that the dimensions are often orthogonalised in order to simplify the processes of calculation. This has been done even though, prior to directing the vectors, one should first study the position in which the dimensions stand in opposition to each other.

It is also problematic that the configuration consists only of the phenomena that are taken in the process of measurement. The insertion of even one new phenomenon to the measurement causes a change in the entire configuration.

An important approach to personality description is the systemic one in which personality is described in dynamic interaction with its environment and as an integral part of it. It is unnecessary to split personality description - personality should be grasped in its dynamic interaction with the wider systems of society and nature. It is essential to integrate the various personality spheres in one systemic whole for purposes of adequately describing the inner structure and functioning of personality.

An attempt should be made to specify exactly how these different methods of description can be used in personality description. A particular aim of research is also to develop new approaches to the description of personality.

2. THE PARADIGMATIC FOUNDATIONS OF RESEARCH ON PERSONALITY

One central part in the paradigm of the educational sciences consists of notions concerning the foundations of the relevant scientific phenomena. Such foundational notions are open to criticism, stimulate scientific discussion, and become more accurate in the course of scientific progress. Aware of the problems involved, I shall present a few paradigmatic foundations for studying the phenomenon of personality within the framework of the educational sciences.

A profound analysis of even one basic principle would, in itself, be an extensive scientific task. While presenting the paradigmatic foundations I make use of knowledge collected on the phenomenon of personality in the field of the educational sciences and in other branches of science. I have endeavoured to deepen this knowledge through intensive discussions with experts of different branches of science. The paradigmatic foundations I present are not meant to be considered the latest discoveries of science. My aim is rather to stimulate scientific discussion and thus to promote a more developed scientific definition of the phenomenon of personality. Naturally my suggestions for the paradigmatic foundations of personality do not include all the foundations of this phenomenon. I hope that other scholars will complete the task.

The concept of personality can be defined as a totality. In the framework of this totality different spheres are defined. Furthermore, independent factors are

defined in different spheres. Diverse scientific schools of thought have defined personality in various ways. On the basis of the definitions suggested by various schools an extensive and many-sided definition of personality may be developed.

In scientific theories personality has been described from the monistic, dualistic, or pluralistic standpoint. The general problem is both to be able to explain the diversity of phenomena in the field of personality and to achieve integration for the description. Although the monistic approach achieves integration because of its unified explanatory basis, it seems to restrict the field of personality description. The disadvantage of both dualistic and pluralistic description, in turn, is that they are problematic when integrating personality. Pluralistic description, however, seems to be the most appropriate approach to describing the numerous spheres of personality. The connection between the spheres should be described by using the concept of the integration of personality.

Personality can be described as general, specific or individual according to the extensiveness of the field of description. The most general sense of description implies an attempt to describe personality as broadly and as extensively as possible. This is the fundamental objective of the educational sciences. The educational sciences also need a specific sense of description in which some sector of personality is concentrated on. This is required for different professional needs, ideologies, illnesses or anomalies, as well as for describing the sub-levels and super-levels of personality etc.. General and specific personality descriptions are suitable for describing groups of people. In addition, there is a need for an individual personality description for diverse applications.

An individual personality description focuses on those unique individual characteristics which are not included in the more general description approaches.

In the educational sciences either holistic or atomistic approaches to describing personality can be used for different purposes. Few are the scientific approaches that would use only one of these two. The holistic approach gives an overall picture of the whole field or a whole sector of personality. The atomistic description splits personality into numerous sectors and elementary factors, thus yielding much detailed information. For information shedding light on the connection between the details and their mutual relations the holistic approach should be used. The question of which of these descriptive strategies should be used is determined by the aims of the research.

2.1. The conative energy mechanisms

Personality has to be understood as a dynamically integrated whole. The basis of this dynamic integration is to be found in the energy mechanisms of the ego. These mechanisms may be called conative. They consist of four basic components: (i) those maintaining personal stability; (ii) those propelling growth, development and change; (iii) those guiding and maintaining activity and behaviour; (iv) those maintaining personality as a system.

These conative energy mechanisms are the focus of interest of various sciences. In the educational sciences they are understood as a manifold static-dynamic energy reservoir. Their functioning can be initiated from within as well as from an outer stimulus. Their various ways of functioning are partly learned. The educational sciences are mainly interested in such energy mechanisms that can be educationally influenced or that play an important part in the learning process.

A great amount of research has been conducted in physiology, anatomy and the behavioural sciences focusing on the energy mechanisms of the ego. This research obviously has important implications for education. Information about energy mechanisms falls within the area of several sciences and it has been acquired for various purposes. To collect and systematize such diversified information may be problematic, since scientific training is not interdisciplinary. This information should be collected by interdisciplinary research groups.

Various scientific approaches set different goals for their research focusing on conative energy mechanisms. They use different methods and acquire different kinds of information. To use this diversified information for educational purposes presupposes an understanding of the methods, approaches, and evaluation based on this understanding. When applying this information in the educational sciences, one has to distinguish between different levels of information involved. Various schools of thought in the behavioural sciences study the energy mechanisms from different starting points, with different scientific methods and for different purposes. This diversity has its problems. For example, motivation as an energy mechanism has been dealt with in various

ways that are sometimes even contradictory. Certain schools of thought do not even accept the concept of motivation as an energy mechanism. In so far as schools of thought differ in their conceptions of the paradigmatic foundations of personality, the conative energy mechanisms will also receive different definitions. For example, the Christian view of man sets conscience as a central energy mechanism of personality. The materialistic view of man does not make this presupposition and does not study conscience as a conative energy mechanism.

There are also problems concerning the existence and observability of these phenomena. For example, the conscious-unconscious dimensions are problematic from the standpoint of observation. In various spheres of personality certain energy mechanisms have been presupposed even though their existence cannot be proved; they can also be presupposed to function in the context of certain forms of behaviour. It is, for example, problematic to observe the energy mechanisms functioning in the background of thinking and emotion. Our knowledge of these problem areas has to be specified and made more exact. Certain strategies can be applied here. We can collect the existent information about conative energy mechanisms. We can then proceed to synthesize it, analyze it, collect it into systematic wholes, and then study the interrelationships between various energy mechanisms, their character, intensity and development.

2.2. Functional mechanisms

Personality has been described as more or less functional or as more or less structural. Both ways of describing it can be used. The structural approach enables a more thorough description, while the functional approach makes it possible to describe personality more widely. The functional description can also be used when the basic process is unknown.

Defining the phenomenon of personality as a whole is also a problem: which phenomena should we define as belonging to personality as such and which should we define as functional or technical mechanisms of personality, or as factors closely connected with it. It is practical to describe personality as spheres and as factors of these spheres. In practical situations it is also useful to describe personality as larger functional mechanisms and readinesses. The description of such functional mechanisms and readinesses can become more accurate by anchoring them in specific spheres of personality. Different scientific schools of thought and different branches of science present varying conceptions of this problem. It is practical to include in the definition those factors closely connected with personality as well as the functional mechanisms of personality. Certain functional mechanisms have sometimes been included in the concept of personality and sometimes excluded from it (even if closely linked with it).

There are some phenomena closely connected with the concept of personality which should be specified. There are various functional mechanisms that do not actually belong to personality, but which are so closely linked with it that it is

practical to recognize them while defining personality. Thought, some physiological phenomena, and many acquired mechanisms are examples of such functional mechanisms. Many technical mechanisms closely connected with actions are also linked with personality, for example, mechanisms regulating body functions, motives and energy of the ego. Large behavioural wholes, which are referred to by a fixed term, are closely connected with the field of personality. Examples of such extensive behavioural wholes are musical talent, personality tempo and religiousness. The quantity and quality of these phenomena are also significant, although their inclusion complicates research.

Both the study of the quantity and quality of certain phenomena in personality as well as the technical mechanisms connected with personality bring up an additional factor influencing personality: how much of the total capacity of his personality is an individual able to use. The phenomenon can be specified through discussing personality as a separate capacity-ability concept. Capacity implies the personality of an individual from the standpoint of structure. The term 'ability' is understood here as referring to the sphere of personality which one has dispositionally due to the manifold possibilities of using one's personality.

When describing personality there is reason for classifying behaviour according to different levels; for example, the conscious-unconscious level has aroused considerable interest in certain personality theories. Here the conscious-unconscious is seen from man's own standpoint. There is no reason to discuss this level as a dichotomy, but rather as a dimension of personality. There is also reason to note the simple-complex level of behaviour. In the sphere of learning,

for example, the conditioned reflex offers an example of simple behaviour, and insight, on the other hand, an example of complex behaviour. Correspondingly, in the sphere of motor behaviour the simple reaction-choice pattern can be found. Personality description is more varied when the various levels of behaviour are taken into consideration.

2.3. Acquired characteristics

It can be stated as a paradigmatic basic principle that the phenomenon of personality, as it is dealt with in the educational sciences, includes both inherited and environmental factors. To define the part played by heredity and environment in the development of personality is an extensive scientific problem. This problem could be approached, for example, from the standpoint of the concept of substance used by many branches of science. By means of this concept, the part of heredity can be presented as a framework with which characteristics can be connected. The description can be complemented by the concept of disposition according to which behaviour is an inclination to behave in a way determined by structural readinesses.

One essential question is whether acquired characteristics are to be considered part of personality. In the history of the educational sciences, acquired characteristics have been defined at least as partly belonging to the field of personality. There are three spheres of acquired characteristics that have central relevance in the educational sciences. The first of these is the sphere of knowledge. An individual's knowledge increases during the course of his

development. Knowledge can be defined as part of the field of personality, although this has its problems. First of all, the definition of knowledge as such causes problems. In addition, it is difficult to obtain substantiated information on the existence of knowledge in personality. The way knowledge manifests itself in different levels of personality, the retention of knowledge, knowledge which is at one's disposal, and the diverse forms of knowledge are phenomena that are difficult to define as parts of the sphere of personality.

The second sphere of acquired characeristics, which is problematic to define as belonging to personality, is the sphere of skills. The problems with respect to skills are, to a great extent, the same as those in the sphere of knowledge. Many skills are regarded as part of the field of personality because they are closely linked with man's overt behaviour. On the other hand, many such skills which can be taught can hardly be defined as parts of personality. Examples of such skills are professional skills and hobby skills.

The third sphere of acquired characteristics relates to certain factors of an affective nature. Several sectors of the affective sphere are formed through the influence of experience, learning, or various kinds of stimuli and thus belong to the field of acquired characteristics. In the mid 1900s attitudes became a central object of study. Attitudes and values are considered a central sphere of personality. In defining the affective sphere as part of personality, the problems are similar to the problems encountered in the sphere of knowledge.

A particular problem in the affective sphere is the realm of conviction and belief. Many great religions regard basic religious convictions as parts of

personality. An example of this is the conception of Christian faith according to which conscience is closely connected with personality and regulates it. Science has approached the phenomenon of conviction in two ways. On the one hand, an attempt has been made to consider the sphere of conviction as a part of the field of personality. Two approaches can be applied here. Firstly, to admit that conviction as such is part of personality. And secondly, to define conviction as being a prerequisite of knowledge and then to proceed to conduct research on the basis of assumptions acquired through conviction without further questioning the essence of conviction.

On the other hand, the sphere of conviction has been approached purely from an epistemological viewpoint. In certain scientific and philosophical approaches conviction-based knowledge has been considered one valid form of knowledge. Many epistemological problems originate here. One approach to conviction-based knowledge is to consider it a kind of presumption for the existence of knowledge. By means of scientific methods an attempt should be made to clarify the status of conviction-based knowledge, preferably so that at least some spheres of it would be transformed into a more precisely defined kind of knowledge.

It is problematic to define exactly the relationship between acquired characteristics and personality. But since the aim of education is to develop such acquired characteristics, it is practical to regard them as part of personality. The relevant definition can be made more precise in the following ways. The phenomena behind the acquired characteristics, and the acquired characteristics as such, are studied. This can promote the description of personality. On the

other hand, this phenomenal entity can be analysed by defining the behaviour of man as multiform. This multiform behaviour is classified into wholes which can be used in defining the sphere of personality. In these wholes such domains of behaviour can be perceived which could be left outside the actual description of personality, since they do not meet the requirements of a personality trait. The acquired characteristics can be more adequately defined after one has precisely defined personality levels (for example, the conscious and the unconscious levels), their mutual interaction and functional mechanisms.

2.4. The dynamic and static aspects of personality

One paradigmatic basic principle in the behavioural sciences is that personality should be described not only as a static, but also as a dynamic phenomenon. The degeneration of instincts, for example, is a dynamic process. However, it is relatively slow with age, so, in practice, the sphere of instincts may be dealt with as a more less static phenomenon. On the other hand, the change in attitudes can occur in a short period - the degree of dynamism is high in some sub-sectors of attitude. Scientific description tends to focus on such general spheres of personality which are relatively static; many spheres which are not static are left outside of scientific description because in the behavioural sciences a personality trait is behaviour defined as having certain constancy.

A central problem is the progress of human development and its bearing on the description of personality. A mature adult is supposed to have an integrated personality. Human personality supposedly achieves maturity between the ages

of 30 and 40. This is preceeded by the development of personality traits. The tempo of development varies in different spheres and factors of personality. There are also individual differences in the process of integration and it is probable that racial and geographical differences are also connected with it. After maturity is achieved, degeneration begins. The tempo of degeneration is different in different spheres and levels of personality. Development and degeneration raise problems for the description of personality for individuals of different ages.

The problem concerning dynamic and static aspects of personality has been much discussed in the educational sciences. A distinction has been drawn between ability-personality and capacity-personality. Capacity-personality implies the personality potential existing in an individual. Man is only partially able to use capacity. Personality in use is ability. One important aim in education is to arrange conditions and to deal with an individual in such a way that the difference between capacity and ability decreases.

In some scientific approaches in the history of science, personality has been dealt with as the present anchored in the past and predestined for the future. Furthermore, it must be taken into consideration that the person as such changes, as does the environment around him.

The dynamic-static problem is centrally connected with both the definition of personality and the theories of the nature, structure and development of personality. Gordon Allport defines personality as "the dynamic organization within the individual of those psycho-physical systems that determine his unique

adjustment to his environment". The definition emphasizes dynamism. The dynamic-static problem is also linked with the very much discussed problem of the influence of heredity and environment on personality. Later I shall discuss the dynamic-static problem as connected with the factors of change. The dynamism problem is firmly associated with the definition of the concept of personality as well as with the foundations of the paradigms, theories, and models explaining personality.

In principle, personality changes through a fourfold process. The first and most important process is the change that the individual undergoes during his life. This change can be described in various ways. It implies growth, degeneration, learning, habit formation, influencing, and action. The changes occur in various spheres of personality. The relations between the spheres change. The level of integration in an individual personality undergoes constant change.

The changes occuring in various personality traits and the changes in the level of integration constitute the change occuring in an individual. This change consists mainly of development and growth. The change can also be pathological or caused by a handicap. It has been stated above that the individual is closely connected with other individuals. The connection is so firm that relationships to other persons form an essential part of an individual personality.

The second process of change occurs in relations to other persons. Here the change functions in two ways. (i) The personality itself changes, this causing changes in those personalities with whom the person associates. (ii) A change

occurs in the mutual relations, and consequently, when the number of the personalities in the connection vary or when there is a change in the closeness of the relationship, changes are reflected in the personality.

The third factor causing change in personality is society. Many societal phenomena are so closely linked with personality that they cannot be kept apart. Society has a continuous effect on many spheres of personality. Change in society provokes change in personality.

The fourth factor having an effect on personality is the universe. Living conditions differ greatly in different parts of the universe. Even in a geographically limited area, natural surroundings influence personality in different ways, of which climate, soil, all kinds of radiation, and nutrition are examples. Natural surroundings can also cause changes in personality through pollution. The recent forecasts give reason to suspect that future changes in natural surroundings will be so radical that they will also provoke significant changes in man's personality. The natural surroundings will have their effect on the personalities of both the present and future generations.

IN CONCLUSION

Above I have discussed various problem areas in the study of personality. Naturally, from the viewpoint of educational science, it would be useful if we were able to know and define personality as a whole in an intelligible and satisfactory manner. This discussion, however, shows that at the present stage of research the very concept of personality is problematic. Besides using scientific knowledge the scholar studying this question is frequently forced to resort to ordinary knowledge. Furthermore, it appears that there are pressures to introduce conviction-based knowledge to the study of personality.

The above discussion shows that the concept of personality is problematic - in the educational sciences it is understood in many different ways. In education the concept of personality also has many meanings. From the standpoint of the science of education it is vital to elucidate this concept further and to systematize the knowledge concerning it into paradigmatic wholes which would be accepted by broad scientific circles. An essential research aim is to establish new and organized phenomena in the field of personality. The knowledge of different kinds obtained from various personality phenomena should be transformed into scientific knowledge.

Above I have given a few examples of the various problem areas in the study of personality. The field should be further studied by means of various scientific approaches. The existing knowledge should be collected to form appropriate entities enabling young researchers, and those who apply this knowledge, to

utilize it. In the process of explicating the field of personality it should be defined more precisely. Thus co-operation between the scientists and those who apply the results of the research would be enhanced and the teaching of the educational sciences would be served. The researchers must collect the scattered studies on personality to form such entities that can be presented to those applying them. New phenomena concerning personality to be explained, described, and recognized have to be continuously sought after. The research on personality can be promoted by developing new scientific methods for its study. In the educational sciences research activity should be directed, to a greater extent, towards developing methods relevant to the study of personality.

Innovation plays an important role in the acquisition of new knowledge. Free innovation is vital for the formulation of study problems, for the discovery and invention of new phenomena in the field, and for the development of new study methods. Innovation can use experimental knowledge. Much of the preliminary knowledge about educational phenomena already exists on the basis of which the research objectives can be formulated. The history of science proves that it is possible to obtain valuable innovative hints from outside of science.

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